



Attorney Docket No. 046972-0102
Application No. 10/511,734

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Davor PROTIC *et al.*

Title: **POSITION-SENSITIVE GERMANIUM DETECTORS
HAVING A MICROSTRUCTURE ON BOTH CONTACT
SURFACES**

Application No.: 10/511,734

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Examiner: Shun K. LEE

Art Unit: 2884

Confirmation No.: 2536

APPELLANTS' BRIEF UNDER 37 C.F.R. §41.41

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Sir:

This Reply Brief on Appeal is being filed under the provisions of 37 C.F.R. § 41.41. No fee is believed to be due. Authorization is hereby given, however, to charge any deficiency (or credit any balance) to the undersigned's deposit account 19-0741.

Argument

The Examiner's Answer appears to make the following central argument:

Hammacher teaches a detector having contacts using a structured, Boron-doped layer. Luke teaches (according to the Examiner) that amorphous Germanium ("a-Ge") is equivalent to Boron doping in this context. Therefore, the substitution of amorphous Germanium into the structure of Hammacher would have been obvious (according to the Examiner) under the Supreme Court's ruling in *KSR Intern. Co. v. Teleflex Inc.*, 127 S.Ct. 1727 (2007) (hereinafter

“KSR”). The Examiner puts forward no express motivation to combine, but rather appears to rely on *KSR*’s “obvious to try” analysis.

The Examiner’s rejection is improper for several reasons. The first of these involves the Examiner’s misapplication of *KSR*’s “obvious to try” analysis.

KSR’s “obvious to try” analysis does not, in fact, state that a known equivalent substituted into a known structure is *per se* obvious. This articulation of the holding of *KSR* leaves out several important elements. As the panel will recall, *KSR* dealt with a combination of a pedal assembly with an electronic sensor. In *KSR*, the Supreme Court ultimately confirmed there was a strong marketplace incentive to make the proposed combination:

There then existed a marketplace that created a strong incentive to convert mechanical pedals to electronic pedals, and the prior art taught a number of methods for achieving this advance.
KSR at 1744.

The Supreme Court found that a number of references disclosed the various elements of the claims, problems to be solved, and how to solve them predictably. Based on these findings, the Court ultimately found that a person of ordinary skill in the art would be able to put an electronic sensor on the pivot point of a pedal to achieve a predictable result, and upheld summary judgment of obviousness.

In so finding, the *KSR* Court articulated an “obvious to try” analysis as follows:

When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill in the art has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. *KSR* at 1732.

The *KSR* standard for “obvious to try” thus requires that there be a (1) design need or market pressure to solve a problem; (2) a finite number of identified, predictable solutions; and (3) a combination that leads a person of art to the anticipated (predictable¹) success.

¹ As quoted by the Examiner, “[W]hen a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.” *KSR* at 1740 (emphasis added).

When this standard is correctly articulated and applied to this case, three technical problems become apparent. First, there was no “design need or market pressure” that would have motivated the suggested combination. Second, a-Ge was not an “identified, predictable solution” (or “known equivalent”) of a Boron-doped layer. Third, the combination does yield more than predictable results.

There Was No Design Need Or Market Pressure

In his April 15, 2008 office action,² the Examiner stated that:

it would have been obvious to one having ordinary skill in the art at the time of the invention to provide an undoped amorphous germanium layer instead of the boron doped layer in the method of Hamacher *et al.*, in order to obtain good bipolar blocking contacts. p. 6 (emphasis added).

Applicants interpreted this as the Examiner’s assertion of a “design need” to find a better blocking contact than Boron. Applicants answered with evidence (in the form of the Protic declaration and supporting references) showing that a Boron-based contact had excellent blocking capabilities. This demonstrated that there were no known blocking problems with a Boron-doped layer, and no design need present. The Examiner responded by stating that the Protic declaration did not have sufficient nexus with the claims to be relevant.³

The Examiner appears to have dropped his design need argument and his objection to the Protic declaration on appeal. With regard to the alleged design need to find a better blocking contact, the Examiner now states:

[t]here was no finding in the 15 April 2008 office action that a particular equivalent blocking contact provides some advantage over another equivalent blocking contact. That is, the rationale is simply to use a known alternative. Answer, p. 10.

With regard to the Protic declaration, the Examiner no longer claims that there is insufficient nexus, but rather responds to the substance of the Protic declaration. *See* Answer, pp. 10-12.

² and in previous office actions.

Thus, on Appeal, the Examiner does not rely on any design need or known problem in the art as part of his motivation to combine Hammacher with Luke. Rather, the Examiner appears to be conflating the first and second portions of the *KSR* “obvious to try” test, by saying that if a-Ge is a known equivalent of Boron, there is no requirement under *KSR* to show any design need motivating a person of ordinary skill to make the substitution.

Applicants submit that this is not the law, and the rejection should be reversed on this ground.

Amorphous Germanium Was Not A Known Equivalent Of A Boron-Doped Layer

The second technical problem inherent in the Examiner’s rejection is that a-Ge was, in fact, known to not be equivalent to a Boron-doped layer. This is demonstrated by portions of the specification and Protic declaration cited in the Appeal Brief, which indicate the known or supposed problems with a-Ge contacts in comparison with a Boron-doped layer prior to the invention. *See* Appeal Brief, pp. 9-11.

The Examiner attacks this evidence, for the first time on appeal, by stating that a detector with an a-Ge layer (having all other elements of the claims) would meet the claim language even if it functioned poorly. *See* Answer, pp. 10-12. Applicants agree, but this is irrelevant. The evidence provided by the Applicants demonstrates that people of ordinary skill in the art did not consider a-Ge to be the equivalent of a Boron-doped layer. This evidence goes to motivation to combine, not to the scope of the Applicants’ claims.

The Examiner also relies on statements in the Luke publication to show the supposed equivalence of a-Ge with a Boron-doped layer. Respectfully, these statements do not demonstrate the equivalence required by *KSR*. The portion of Luke cited in the Examiner’s answer that refers to a-Ge as an “alternative” is preceded by a discussion of the drawbacks of Lithium and Phosphorous-doped contacts. These problems are also discussed in the present application, *see* Appeal Brief, p. 4, and Luke’s discussion of a-Ge appears to be in the direction of replacing Li and P contacts, not Boron. Luke does provide the results of testing the substitution of a Boron-doped layer with a-Ge, but the results appear to have been poor. *See* Luke, p. 591, Fig. 3, a-n-n⁺ leakage current. Luke further notes “[a]morphous Ge blocking contacts on high-purity Ge detectors were investigated in 1977 but the devices

³ This is, at least, the Applicants’ interpretation of the Examiner’s position.

showed large variations in leakage currents" (p. 590) and acknowledges that "further studies need to be carried out to understand how the contacts function, and to fully characterize them...one important issue which has not yet been investigated is the stability of the a-Ge contact with heat treatments, since, in practice, detectors often need to be heated...." Importantly, nowhere does Luke actually say that a-Ge was a known and predictable substitute for a Boron-doped layer. Rather, the overall teaching of Luke shows that the properties of an a-Ge contact were still largely unknown, and still believed to have significant drawbacks. A later publication by Luke and evidence from the Applicants confirm the belief in the art that an a-Ge layer would not provide a sufficiently effective contact to replace a Boron-doped layer. *See Appeal Brief, pp. 6-7.*

The Examiner has therefore not demonstrated the second element of *KSR*'s "obvious to try" test, and the rejection should be reversed on this ground.

The Inventive Result Was Not Predictable

In fact, the key teaching for the use of a-Ge was provided by the Applicants. The Applicants' specification is the first and only teaching of record of a structured a-Ge contact layer.

None of the prior art references of record teach the difference in performance between a structured a-Ge layer and a non-structured a-Ge layer. Hammacher does not appear to discuss a-Ge layers. Luke actually teaches away from the claimed invention by stating that it is advantageous to use a-Ge as a passivation layer. *See Luke, p. 593 and Fig. 8.* At worst, Luke expressly reflects the belief that there is no difference between a structured and unstructured a-Ge layer.

Even if a person of skill in the art had ignored Luke's teaching of the advantages of an a-Ge passivation layer, and had combined Hammacher with Luke in the manner suggested by the Examiner, it would have yielded more than predictable results. As taught only by the Applicants, there is a significant and unpredictable performance increase with a structured layer. Thus, the Examiner has not demonstrated the third element of *KSR*'s "obvious to try" test, and the rejections should be reversed on this ground.

Applicants rest on their Appeal Brief for arguments relating to the dependent claims.

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Applicants respectfully request that the Examiner be reversed, and that the case be remanded with instructions to issue a notice of allowance.

Respectfully submitted,

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